

WHAT IS CLAIMED IS:

1. A method for manufacturing a built-up printed circuit board with stack type via-holes, comprising the steps of:

5 (a) forming a first via-hole through a first laminated copper sheet by means of a laser drill;

(b) forming a first plated layer on the first via-hole and on the first laminated copper sheet;

10 (c) filling the first plated via-hole with a via-hole filling material;

(d) grinding the top surface of the first via-hole filled with the via-hole filling material to level the first via-hole;

15 (e) forming a second plated layer on the first filled via-hole and the first plated layer to cover the first filled via-hole; and

(f) disposing a second laminated copper sheet on the second plated layer, and repeating the steps (a) to (e) to form a second via-hole.

20 2. The method as set forth in claim 1, wherein the laser is a CO₂ laser or an Nd-YAG laser.

25 3. The method as set forth in claim 1, wherein the first and second plated layers are formed by means of P/N plating

(CAP plating).

4. The method as set forth in claim 1, wherein the via-hole filling material is filled in the via-hole by a general screen printing process.

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5. The method as set forth in claim 4, wherein a portion of a poly screen corresponding to the via-hole is opened so that the via-hole filling material passes through the opened portion to fill only the via-hole during the screen printing.

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6. The method as set forth in claim 1, wherein the via-hole filling material is liquefied insulating resin.

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7. The method as set forth in claim 1, wherein the via-hole filling material is conductive paste.

8. The method as set forth in claim 7, wherein the conductive paste is copper paste or silver paste.

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9. The method as set forth in claim 1, wherein a viscosity of the via-hole filling material is not more than 100 dPa.s.

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10. The method as set forth in claim 1, wherein the

grinding step is carried out by a grinder made of ceramic buff, scotch buff, highcut buff, or belt.

11. A method for manufacturing a built-up printed
5 circuit board with stack type via-holes, comprising the steps
of:

(a) forming a first via-hole through a first laminated copper sheet by means of a laser drill;

10 (b) forming a first plated layer on the first via-hole and on the first laminated copper sheet;

(c) filling the first plated via-hole with a via-hole filling material;

15 (d) grinding the top surface of the first via-hole filled with the via-hole filling material to level the first via-hole;

(e) forming a second plated layer on the first leveled via-hole and the first laminated copper sheet to cover the first leveled via-hole;

20 (f) disposing a second laminated copper sheet on the second plated layer,

(g) forming a second via-hole through the second laminated copper sheet by means of the laser drill;

(h) filling the second via-hole with another via-hole filling material;

25 (i) grinding the top surface of the second via-hole

filled with the via-hole filling material to level the second via-hole; and

(j) forming a third plated layer on the second leveled via-hole and the second laminated copper sheet to cover the second leveled via-hole, and forming a circuit pattern on the third plated layer.

12. The method as set forth in claim 11, wherein a viscosity of the via-hole filling material is not more than 100 dPa.s.

13. The method as set forth in claim 11, wherein the filling step of filling the via-hole with the via-hole filling material is carried out using a general screen printing machine.

14. The method as set forth in claim 13, wherein the screen printing machine has a screen of not more than 250 mesh of a poly or stainless steel (SUS) sheet.

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15. The method as set forth in claim 13, wherein the screen printing machine has a rubber squeegee spreading speed of not more than 150 mm/sec.

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16. The method as set forth in claim 11, further

comprising:

firstly drying the printed circuit board at a low temperature of 60 to 80 °C for 15 to 30 minutes; and

secondly drying the printed circuit board at a high temperature of 140 to 160 °C for 30 to 60 minutes,

wherein the first and second drying steps are carried out after the filling step of filling the via-hole with the via-hole filling material.

10 17. The method as set forth in claim 11, wherein the via-hole formed by the laser drill has a diameter of 50 μm to 200 μm .

15 18. A built-up printed circuit board with stack type via-holes, comprising:

- a plurality of first via-holes formed through a first laminated copper sheet by means of a laser drill;

- a first plated layer formed on the first via-holes and the first laminated copper sheet;

20 - a filling material filled in each of the first plated via-holes;

- a second plated layer formed on the first filled via-holes and the first plated layer to cover the first filled via-holes;

25 - a plurality of second laminated copper sheets disposed

on the second plated layer, respectively; and

- a plurality of second via-holes formed through the second laminated copper sheets by means of the laser drill.

19. The board as set forth in claim 18, wherein the
5 laser is a CO₂ laser or an Nd-YAG laser.

20. The board as set forth in claim 18, wherein the first and second plated layers are formed by means of P/N plating (CAP plating).

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21. The board as set forth in claim 18, wherein the via-hole filling material is filled in each of the via-hole by a general screen printing process.

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22. The board as set forth in claim 21, wherein portions of a poly screen corresponding to the via-holes are opened so that the via-hole filling material passes through each of the opened portions to fill only the via-holes during the screen printing.

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23. The board as set forth in claim 18, wherein the via-hole filling material is liquefied insulating resin.

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24. The board as set forth in claim 18, wherein the via-hole filling material is conductive paste.

25. The board as set forth in claim 24, wherein the conductive paste is copper paste or silver paste.